

REMARKS

Reconsideration of this application is respectfully requested. Claims 1-36 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1-25 of U.S. Patent No. 6,182,183 to Wingard. Claims 1, 2, 14, 20, 21, and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Wingard. Claims 3-13, 15-19, 22-30, and 32-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wingard in view of U.S. Patent No. 6,493,776 by Courtright et al.

Claims 1, 6, 14, 20, 25, 31, and 33 have been amended.

Double Patenting

The Examiner rejected Claims 1-36 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1-25 of U.S. Patent No. 6,182,183 to Wingard. Applicants file a terminal disclaimer with Wingard under 37 CFR 1.321 to overcome the above rejection.

Claim Rejections -35 USC § 102

The Examiner rejected Claims 1, 2, 14, 20, 21, and 31 under 35 U.S.C. 102(e) as being anticipated by Wingard. However, applicants respectfully submit independent claim 1, as amended, is not anticipated by Wingard under 35 U.S.C. 102(e). Claim 1, as amended, states:

1. A method for communicating data between functional blocks in a computing device, comprising:
 establishing a thread identifier for each independent data stream between an initiator functional block and a target functional block, wherein a plurality of independent data streams exist between the initiator functional block and the target functional block;

if the target functional block is unable to accept a data transfer from the initiator functional block, the target functional block issuing a busy signal identified by the thread identifier;

the initiator functional block withholding issuance of data transfers associated with the thread identifier in response to the issued busy signal, wherein data transfers not associated with the thread identifier identified by the issued busy signal may be issued; and

mapping a data flow from the initiator functional block to the target functional block to a thread indicated by the thread identifier to meet a service guarantee on a per thread identifier basis.

(emphasis added)

Applicants agree with the Examiner that Wingard does not disclose or suggest mapping a data flow from the initiator functional block to the target functional block to a thread indicated by the thread identifier to meet a service guarantee on a per thread identifier basis. (See office action page 7).

As such, Wingard does not disclose each and every limitation of claim 1.

Therefore, claim 1 is not anticipated by Wingard under 35 U.S.C. 102(e).

Since claim 2 depends from and includes the limitations of claim 1, claim 2 is also not anticipated by Wingard under 35 U.S.C. 102(e).

Likewise, applicants respectfully submit independent claim 14, as amended, is not anticipated by Wingard under 35 U.S.C. 102(e). Claim 14, as amended, states:

14. A method for communicating data between functional blocks in a computing device, comprising:

establishing at least one thread identifier, each thread identifier associating a data transfer with a transaction stream that the data transfer between an initiator functional block and a target functional block are part of;

if the target functional block is unable to accept a data transfer from the initiator functional block, the target functional block issuing a busy signal identified by the thread identifier;

storing in a buffer data transfers received by the target functional block after issuance of the busy signal until resources become available to service the buffered data transfers, the amount of buffer sufficient to

buffer any transfers that arrive after the busy signal is asserted, wherein an interface between the initiator functional block and target functional block does not block data transfers of other threads; and mapping a data flow from the initiator functional block to the target functional block to a thread indicated by the thread identifier to meet a service guarantee on a per thread identifier basis.

(emphasis added)

Applicants agree with the Examiner that Wingard does not disclose or suggest mapping a data flow from the initiator functional block to the target functional block to a thread indicated by the thread identifier to meet a service guarantee on a per thread identifier basis. (See office action page 7). Further, Wingard does not disclose or suggest storing in a buffer data transfers received after issuance of the busy signal until resources become available to service the buffered data transfers. Wingard is completely silent regarding the storing of buffer data transfers received after issuance of the busy signal as well as how long those data transfers are stored. Wingard also does not disclose or suggest the amount of buffer sufficient to buffer any transfers that arrive after the busy signal is asserted so that an interface between the initiator functional block and target functional block does not block data transfers of other threads. Wingard is completely silent regarding the size of this storage buffer.

As such, Wingard does not disclose each and every limitation of claim 14. Therefore, independent claim 14 is not anticipated by Wingard under 35 U.S.C. 102(e).

Likewise, applicants respectfully submit independent claim 20, as amended, is not anticipated by Wingard under 35 U.S.C. 102(e). Claim 20, as amended, states:

20. A communication apparatus, comprising:
at least two functional blocks, wherein an initiator functional block communicates with a target functional block by establishing a connection;

a bus coupled to each of the functional blocks and configured to carry a plurality of signals, wherein the plurality of signals comprises a thread identifier configured to associate a data transfer with a transaction stream between the initiator functional block and target functional block, and a credit signal identified by the thread identifier, the credit signal issued by the target functional block to indicate how many data transfers the target functional block can accept, wherein the initiator functional block associated withholds issuance of data transfers associated with the thread identifier if the credit signal indicates that the target functional block can accept no data transfers, and the bus being non-blocking, via the use of credit signals, to enable a determination of service guarantees for transaction streams between initiator functional blocks and target functional blocks.

(emphasis added)

Applicants agree with the Examiner that Wingard does not disclose or suggest the determination of service guarantees. (See office action page 7). Further, Applicants agree with the Examiner that Wingard does not disclose or suggest the use of credit signals. (See office action page 7).

As such, Wingard does not disclose each and every limitation of claim 20. Therefore, independent claim 20 is not anticipated by Wingard under 35 U.S.C. 102(e).

Since claim 21 depends from and includes the limitations of claim 20, claim 21 is also not anticipated by Wingard under 35 U.S.C. 102(e).

Likewise, applicants respectfully submit independent claim 31, as amended, is not anticipated by Wingard under 35 U.S.C. 102(e). Claim 31, as amended, states:

31. A communication apparatus, comprising:
at least two functional blocks, wherein an initiator functional block communicates with a target functional block by establishing a connection;
a bus coupled to each of the functional blocks and configured to carry a plurality of signals, wherein the plurality of signals comprises at least one thread identifier configured to associate a data transfer with a transaction stream that the data transfer between an initiator functional block and a target functional block are part of; wherein if the target

functional block is unable to accept a data transfer from the initiator functional block, the target functional block issuing a busy signal identified by the thread identifier and buffering data transfers received after issuance of the busy signal until resources become available to service the buffered data transfers;

a buffer coupled to the target functional block, the size of the buffer sufficient to buffer any number of data transfers that arrive on the transaction stream after the busy signal is asserted; and

wherein the bus implements a mapping algorithm to map data flow of the transaction stream and aggregate service guarantees from components between the initiator functional block and the target functional block.

(emphasis added)

As discussed above, Wingard does not disclose or suggest 1) determining service guarantees, 2) buffering data transfers received after issuance of the busy signal until resources become available to service the buffered data transfers, or 3) the size of the buffer.

As such, Wingard does not disclose each and every limitation of claim 31. Therefore, independent claim 31 is not anticipated by Wingard under 35 U.S.C. 102(e).

Claim Rejections -35 USC § 103

The Examiner rejected claims 3-13, 15-19, 22-30, and 32-36 under 35 U.S.C. 103(a) as being unpatentable over Wingard in view of Courtright. However, applicants respectfully submit independent claim 1, as amended, is not obvious in view of Wingard and Courtright under 35 U.S.C. 103(a). Claim 1, as amended, states:

1. A method for communicating data between functional blocks in a computing device, comprising:

...
mapping a data flow from the initiator functional block to the target functional block to a thread indicated by the thread identifier to meet a service guarantee on a per thread identifier basis.

(emphasis added)

As discussed above, Wingard does not disclose or suggest mapping a data flow from the initiator functional block to the target functional block to meet a service guarantee on a per thread identifier basis. Applicants point out that Courtright does not disclose or suggest mapping a data flow from the initiator functional block to the target functional block to meet a service guarantee on a per thread identifier basis. Courtright is completely silent regarding service guarantees as well as mapping data flows. Courtright never integrates a flow control mechanism with anything related to service guarantees. Col 7 lines 54-67 of Courtright merely describe an overview of a bus with an arbiter. Applicants respectfully traverse the Examiner's assertion that at the time of this application's file date "it is inherent in flow control mechanism to integrate industry standard algorithms such as QOS to provide improve network or data transfer service." Applicants request documentary evidence to support this assertion. Even if the Examiner can prove this assertion with documentation, it is not inherent to utilize a flow control mechanism to map a data flow from the initiator functional block to the target functional block to meet a service guarantee on a per thread identifier basis.

As such, neither Courtright nor Wingard, individually or in combination, discloses each and every limitation of independent claim 1 as amended.

It is also respectfully submitted that Courtright does not suggest a combination with Wingard, and Wingard does not suggest a combination with Courtright. The Examiner has not indicated any text or references in either document that actually suggests such a combination. Since mapping data flows is not disclosed in either reference, it would not be obvious to one reading these documents to map a data flow from the initiator functional block to the target functional block to a thread indicated by

the thread identifier to meet a service guarantee on a per thread identifier basis. It would be impermissible hindsight to combine Courtright with Wingard based on Applicant's own disclosure.

Accordingly, claim 1 is not rendered obvious by Courtright in view of Wingard under 35 U.S.C. 103(a). Since claims 2-13 depend from and include the limitations of claim 1, claims 2-13 are also not rendered obvious by Courtright in view of Wingard.

Likewise, applicant respectfully submits that the independent claim 14 is not obvious under 35 U.S.C. 103(a) in view of Courtright and Wingard. Claim 14, as amended, states:

14. A method for communicating data between functional blocks in a computing device, comprising:

...
storing in a buffer data transfers received by the target functional block after issuance of the busy signal until resources become available to service the buffered data transfers, the amount of buffer sufficient to buffer any transfers that arrive after the busy signal is asserted, wherein an interface between the initiator functional block and target functional block does not block data transfers of other threads; and

mapping a data flow from the initiator functional block to the target functional block to a thread indicated by the thread identifier to meet a service guarantee on a per thread identifier basis.

(emphasis added)

As discussed above, Wingard does not disclose or suggest 1) determining service guarantees, 2) buffering data transfers received after issuance of the busy signal until resources become available to service the buffered data transfers, or 3) the size of the buffer. Similarly, Courtright does not disclose or suggest 1) determining service guarantees, 2) buffering data transfers received by the target functional block, or 3) the size of the buffer. Col 9, lines 16-23 of Courtright discloses a buffer associated with an initiating functional block rather than transaction buffers on the receiving side.

Courtright is completely silent regarding service guarantees as well as mapping data flows.

As such, neither Courtright nor Wingard, individually or in combination, discloses each and every limitation of independent claim 14 as amended.

It is also respectfully submitted that Courtright does not suggest a combination with Wingard, and Wingard does not suggest a combination with Courtright. The Examiner has not indicated any text or references in either document that actually suggests such a combination. Since mapping data flows is not disclosed in either reference, it would not be obvious to one reading these documents to map a data flow from the initiator functional block to the target functional block to a thread indicated by the thread identifier to meet a service guarantee on a per thread identifier basis. It would be impermissible hindsight to combine Courtright with Wingard based on Applicant's own disclosure.

Accordingly, claim 14 is not rendered obvious by Courtright in view of Wingard. Since claims 15-19 depend from and include the limitations of claim 14, claims 15-19 are also not rendered obvious by Courtright in view of Wingard.

Likewise, applicant respectfully submits that the independent claim 20 is not obvious under 35 U.S.C. 103(a) in view of Courtright and Wingard. Claim 20, as amended, states:

20. A communication apparatus, comprising:

...
a credit signal identified by the thread identifier, the credit signal issued by the target functional block to indicate how many data transfers the target functional block can accept, wherein the initiator functional block associated withholds issuance of data transfers associated with the thread identifier if the credit signal indicates that the target functional block can accept no data transfers, and the bus being non-blocking, via

the use of credit signals, to enable a determination of service guarantees for transaction streams between initiator functional blocks and target functional blocks.

(emphasis added)

As discussed above, Wingard does not disclose or suggest 1) determining service guarantees, 2) or use of credit signals. Similarly, Courtright is completely silent regarding service guarantees as well as mapping data flows. Courtright never integrates the credit-based flow control mechanism with anything related to propagating service guarantees.

As such, neither Courtright nor Wingard, individually or in combination, discloses each and every limitation of independent claim 20 as amended.

It is also respectfully submitted that Courtright does not suggest a combination with Wingard, and Wingard does not suggest a combination with Courtright. The Examiner has not indicated any text or references in either document that actually suggests such a combination. It would be impermissible hindsight to combine Courtright with Wingard based on Applicant's own disclosure.

Accordingly, claim 20 is not rendered obvious by Courtright in view of Wingard. Since claims 21-30 depend from and include the limitations of claim 20, claims 21-30 are also not rendered obvious by Courtright in view of Wingard.

Likewise, applicant respectfully submits that the independent claim 31 is not obvious under 35 U.S.C. 103(a) in view of Courtright and Wingard. Claim 31, as amended, states:

31. A communication apparatus, comprising:

...
wherein if the target functional block is unable to accept a data transfer from the initiator functional block, the target functional block

issuing a busy signal identified by the thread identifier and buffering data transfers received after issuance of the busy signal until resources become available to service the buffered data transfers;

a buffer coupled to the target functional block, the size of the buffer sufficient to buffer two or more data transfers that arrive on the transaction stream after the busy signal is asserted; and

wherein the bus implements a mapping algorithm to map data flow of the transaction stream and aggregate service guarantees from components between the initiator functional block and the target functional block.

(emphasis added)

As discussed above, Wingard does not disclose or suggest 1) mapping data flows of the transaction stream and aggregating service guarantees, 2) buffering data transfers received after issuance of the busy signal until resources become available to service the buffered data transfers, or 3) the size of the buffer. Similarly, Courtright does not disclose or suggest 1) determining service guarantees, 2) buffering data transfers received by the target functional block, or 3) the size of the buffer.

As such, neither Courtright nor Wingard, individually or in combination, discloses each and every limitation of independent claim 31 as amended.

It is also respectfully submitted that Courtright does not suggest a combination with Wingard, and Wingard does not suggest a combination with Courtright. The Examiner has not indicated any text or references in either document that actually suggests such a combination. It would be impermissible hindsight to combine Courtright with Wingard based on Applicant's own disclosure.

Accordingly, claim 31 is not rendered obvious by Courtright in view of Wingard. Since claims 32-36 depend from and include the limitations of claim 31, claims 32-36 are also not rendered obvious by Courtright in view of Wingard.

Claim 6 and claim 25 are patentable over Courtright in view of Wingard under 35 U.S.C. 103(a) for the following additional reasons. Courtright's use of credits is not via a multi-bit encoded signal. Col 2 lines 20-35 of Courtright say nothing about coded credit signals. Wingard is completely silent regarding the use of credit signals. As such, neither Courtright nor Wingard, individually or in combination, discloses each and every limitation of independent claim 6, as amended. Likewise, neither Courtright nor Wingard, individually or in combination, discloses each and every limitation of independent claim 25, as amended.

Claims 11, 18, 28, 34, 12, 19, 29, 35, 13, 30 and 36 are patentable over Courtright in view of Wingard under 35 U.S.C. 103(a) for the following additional reasons. Courtright does not talk about mapping of transaction streams and aggregating service guarantees. All the cited sections by the office action literally discuss bus arbitration, which is not the same concept as determining service guarantees. Wingard is completely silent regarding mapping of transaction streams and aggregating service guarantees. As such, neither Courtright nor Wingard, individually or in combination, discloses each and every limitation of claims 11, 18, 28, 34, 12, 19, 29, 35, 13, 30 or 36.

Claims 8, 16, and 33 are patentable over Courtright in view of Wingard under 35 U.S.C. 103(a) for the following additional reasons. Col 8 lines 49-52 of Courtright disclose a simple bus that allows only a single transaction to be outstanding. "The processor 101 wait[s] until a data portion of the bus cycle completes before it was allowed to issue another read request." (Col. 8 lines 49-52) Courtright does not disclose a target functional block receiving no more than a determined number of one or

more data transfers after issuance of the busy signal for flow control purposes. Wingard is completely silent regarding a target functional block receiving no more than a determined number of two or more data transfers after issuance of the busy signal. As such, neither Courtright nor Wingard, individually or in combination, discloses each and every limitation of Claims 8, 16, or 33.

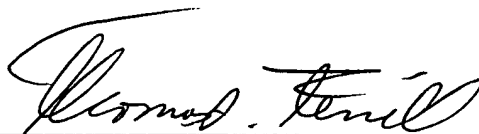
Conclusion

It is respectfully submitted that in view of the amendments and remarks set forth herein, the rejections and objections have been overcome. Applicants reserve all rights with respect to the application of the doctrine equivalents. If there are any additional charges, please charge them to our Deposit Account No. 02-2666. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

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Thomas S. Ferrill
Reg. No. 42,532
Tel.: (408) 720-8300

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, CA 90025-1026